

Amendment to the Claims

1-14. (Cancelled)

15. (New) A three-dimensional conveyor including a plurality of top plate units and a plurality of couplers connecting together the top plates units to form an endless conveyance path in three-dimensional directions, each of the couplers comprising a coupler rod and two terminal balls at the ends of the coupler rod,

each of the top plate units comprising:

- a top plate having a top face for supporting an article to be conveyed;
- a clasp plate fixed to a bottom face of the top plate;
- a first ball-holding cavity formed in a front portion of the top plate unit;
- a first coupler rod insertion hole communicated with the first ball-holding cavity;
- a second ball-holding cavity formed in a rear portion of the top plate unit;
- a second coupler rod insertion hole communicated with the second ball-holding

cavity;

sprocket engagement portions having at least two teeth for engaging with sprockets, said sprocket engagement portions being formed on each of the right and left sides of the ball-holding cavities on the top plate or on the top plate and the clasp plate of the top plate unit; and

guide grooves provided outwardly of each of the left and right sprocket engagement portions, respectively, wherein each of the guide grooves has a U-shaped cross-section opening outward,

wherein the first and second coupler rod insertion holes are formed to pass from the first and second ball-holding cavities, respectively, to a front face or rear face of the top plate unit so as to enable movement of the couplers in three-dimensional directions within a prescribed angle range,

wherein the terminal balls are loosely fit into the ball-holding cavities so as to be

turnable therein,

wherein the distance between the centers of the first and second terminal balls at the ends of each of the coupler rods is equal to the distance between the centers of first and second ball-holding cavities of each of the top plate units;

wherein the top plate units, which are coupled together by the couplers, are rotatable 360° around a center line in a traveling direction of the top plate units and are turnable freely upward, downward, rightward, leftward, or slantingly around the center of the respective terminal ball, and

wherein the top plate units, which are connected by the couplers, can be driven by engaging the sprocket engagement portions with the sprockets.

16. (New) The three-dimensional conveyor according to claim 15, wherein a projecting pin is provided to project vertically downward at the center of the bottom face of the top plate units, and a laterally rotating sprocket is allowed to engage with the projecting pins to drive the conveyor constructed in one level or plural stairs.

17. (New) The three-dimensional conveyor according to claim 16, wherein a roller engaging with the sprocket is provided rotatably on an outside periphery of the projecting pin projecting vertically downward at the center of bottom face of the top plate units..

18. (New) The three-dimensional conveyor according to claim 15, wherein a forward path and returning path of the endless conveyor are arranged in two stairs, and the top plate units are reversed in the returning path to bring the top plate faces upward for conveyance of an article in both the forward path on the upper stair and the returning path on the lower stair.

19. (New) The three-dimensional conveyor according to claim 15, wherein a cushioning material is provided on the top plate face of each of the top plate units for cushioning the conveyed article.

20. (New) The three-dimensional conveyor according to claim 19, wherein the cushioning material provided on the top plate faces is a soft fuzzed member or a gill-shaped member.
21. (New) The three-dimensional conveyor according to claim 15, wherein slip-stopping ledges are provided at intervals of a prescribed number of the top plate units for preventing slip of the conveyed articles on the top plate faces of the top plate units.
22. (New) The three-dimensional conveyor according to claim 15, wherein each of the couplers is constituted of a metal material, and the peripheral outside faces of the terminal balls are coated with a hard synthetic resin material having a low frictional coefficient, or are treated with a film coating to lower the frictional coefficient.
23. (New) The three-dimensional conveyor according to claim 15, wherein a lubricant pool for filling a lubricant is provided in a portion of the ball-holding cavities formed in each of the top plate units.
24. (New) The three-dimensional conveyor according to claim 15, wherein each of the terminal balls includes a lubricant pool provided in a portion thereof.
25. (New) The three-dimensional conveyor according to claim 15, wherein an article-catching mechanism for catching a conveyed article is provided on each of the top faces of a predetermined number of the top plates.
26. (New) A three-dimensional conveyor including a plurality of top plate units and a plurality of couplers connecting together the top plates units to form an endless conveyance path in three-dimensional directions,
each of the couplers comprising a coupler rod and two terminal balls at the ends of the coupler rod,

each of the top plate units comprising a top plate having a top face for supporting an article to be conveyed, and a clasp plate fixed to a bottom face of the top plate, wherein:

a front ball-holding cavity is formed in a front portion of each of the top plate units, and a front coupler rod insertion hole extends from the front ball-holding cavity through a front face of the respective top plate unit,

a rear ball-holding cavity is formed in a rear portion of each of the top plate units, and a rear coupler rod insertion hole extends from the rear ball-holding cavity through a rear face of the respective top plate unit,

the first and second coupler rod insertion holes are formed to enable movement of the couplers in three-dimensional directions within a prescribed angle range, and the terminal balls are rotatably and loosely fit in the ball-holding cavities, respectively,

each of the top plate units includes left and right sprocket engagement portions each having at least two teeth for engaging with sprockets, said sprocket engagement portions being formed outward of the respective front and rear ball-holding cavities with respect to a center line, in a traveling direction, of the top plate units, and

a guide groove is provided outwardly of each of the left and right sprocket engagement portions of each top plate unit, each of the guide grooves has a U-shaped cross-section opening outward so as to be engagable with a guide rail to guide the top plate units, and

the top plate units, which are coupled together by the couplers, are rotatable 360° around the center line in the traveling direction of the top plate units and are turnable freely upward, downward, rightward, leftward, or slantingly around the center of the respective terminal ball.